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# PATENT SPECIFICATION

Application Date: Aug. 24, 1922. No. 22,981/22.

203,508

Complete Left: Feb. 23, 1923.

Complete Accepted: Sept. 13, 1923.



## PROVISIONAL SPECIFICATION.

Improvements in and relating to Set Screws for Securing Wheels, Bosses, Collars, and the like, upon Shafts and the like.

We, THOMAS TURNER HINDLE, of Eden View, Eckersley Road, Bolton, in the County of Lancaster, Engineer, British, and CHARLES CYRIL HINDLE, of Eden View, Eckersley Road, Bolton, in the County of Lancaster, Draughtsman, British, do hereby declare the nature of this invention to be as follows:—

The object of our invention is to provide a set screw with a hardened steel point constructed in the form of a cutter, in such a manner that the action of screwing-up locks the set screw on to the shaft and prevents the screw becoming loose or accidentally working back until considerable force is exerted to unscrew it.

In carrying out our invention we provide a steel set screw of any standard type and form a small recess in the centre of the point, or shank forming a ring. The ring shaped end is formed into a cutter with a series of saw shaped teeth which may be cut, formed or pressed, arranged radially, and this portion of the set screw is then hardened, or we provide an iron set screw with a piece of steel (capable of being hardened) welded on to the end which is formed into a cutter, or we provide a grub screw with a square or polygonal hole punched, forged, or broached at each end. The hole at the top end is

for the insertion of the screw key. The portion forming the cutter is made detachable, and is made of hard steel and is provided with a shank which will fit into the square or polygonal hole formed in the bottom end of the screw, so that when the screw is turned by the key the cutter will turn with it.

In order to secure the boss or the like upon the shaft, the boss is tapped and the screw inserted in the usual manner, the boss is then placed upon the shaft which is arranged preferably with a flat surface upon which the cutter end of the set screw will bear. The action of screwing-up causes the cutting edges of the screw to cut into the metal of the shaft, raising burrs in front of the cutting edges and in consequence behind the backed-off portion of the teeth forming a lock or obstruction to the unscrewing as the burrs thus formed require to be sheared-off by the backed-off portion of the cutter teeth, by turning the set screw backwards, a distance equal to the pitch of the teeth of the cutter, which necessitates considerable force being used, before the screw can be released.

Dated the 23rd day of August, 1922.  
T. TURNER HINDLE.  
C. C. HINDLE.

## COMPLETE SPECIFICATION.

Improvements in and relating to Set Screws for Securing Wheels, Bosses, Collars, and the like, upon Shafts and the like.

We, THOMAS TURNER HINDLE, of "Eden View," Eckersley Road, Bolton, in the County of Lancaster, British, and CHARLES CYRIL HINDLE, of "Eden View," Eckersley Road, Bolton, in the County of Lancaster, British, do hereby  
[Price 1/-]

declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The object of our invention is to pro-

vide a set screw with a hardened steel point, constructed in the form of an annular saw toothed cutter in such a manner that the action of screwing up locks the set screw on to the shaft and prevents the screw becoming loose or accidentally working back, until considerable force is exerted to unscrew it.

In carrying out our invention we provide a steel set screw of any standard type and form it with a small recess in the centre of the point or shank forming a ring. The ring shaped end is formed into a cutter with a series of saw shaped teeth, which may be cut, forged, or pressed, arranged radially and this portion of the set screw is then hardened, or we provide an iron set screw with a piece of steel (capable of being hardened) welded on to the end, which is formed into a cutter, or we provide a grub screw with a square or polygonal hole punched, forged or broached at each end. The hole at the top end is for the insertion of the screw key. The portion forming the cutter is detachable and is made of hard steel, and provided with a shank which will fit into the square or polygonal hole formed in the bottom end of the screw so that when the screw is turned by the key the cutter will turn with it.

In order to secure the boss or the like upon the shaft, the boss is tapped and the screw is inserted in the usual manner. The boss is then placed upon the shaft, which is arranged preferably with a flat surface upon which the cutter end of the set screw will bed.

The action of screwing up causes the cutting edges of the screw to cut into the metal of the shaft, raising burrs in front of the cutting edges and in consequence behind the backed off portion of the teeth, forming a lock or obstruction to the unscrewing, as the burrs thus formed require to be sheared off by the backed off portion of the teeth, by twisting the set screw backwards a distance equal to the pitch of the teeth of the cutter, which necessitates considerable force being used, before the screw can be released.

The accompanying drawings illustrate our invention.

Like figures and letters represent like parts. 55

Fig. 1 is a side elevation of a set screw, with the cutter portion *a* and recess *a*<sup>1</sup> formed on the end, the cutting edge of one of the teeth *a*<sup>2</sup>, and the backed off portion of the tooth *a*<sup>3</sup>. 60

Fig. 2 is an end view of Fig. 1.

Fig. 3 is a sectional elevation of a set screw, with a hard steel cutter *b*, recess *b*<sup>1</sup> and cutter shank *b*<sup>2</sup>. 65

Fig. 4 is an end view of Fig. 3.

Fig. 5 is a side elevation of a grub screw, with cutter portion *c*, and recess *c*<sup>1</sup>, formed on end, with hole for screw key *c*<sup>2</sup>. 70

Fig. 6 is an end view of Fig. 5.

Fig. 7 shews a grub screw *d* in section, and the cutter *d*<sup>1</sup>, in elevation. The square or polygonal hole or recess *d*<sup>2</sup>, is for the insertion of the cutter shank *d*<sup>3</sup>, at the one end, and the insertion of the screw key, at the other end. 75

Fig. 8 is an end view of Fig. 7.

We are aware of Specification No. 6146/12 and do not claim anything therein disclosed. 80

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:-- 85

1. A set screw with hardened steel annular saw tooth cutter formed on the end, as and for the purpose herein described and illustrated by the annexed drawings. 90

2. A set screw with hard steel cutter inserted in the end, as and for the purpose herein described and illustrated by the annexed drawings. 95

3. A grub screw with hardened steel annular saw toothed cutter formed on the end, as and for the purpose herein described and illustrated by the annexed drawings. 100

4. A grub screw provided with a detachable hard steel cutter inserted in the end, as and for the purpose herein described and illustrated by the annexed drawings. 105

Dated the 21st day of February, 1923.

T. TURNER HINDLE.  
CHARLES CYRIL HINDLE.

[This Drawing is a reproduction of the Original on a reduced scale.]

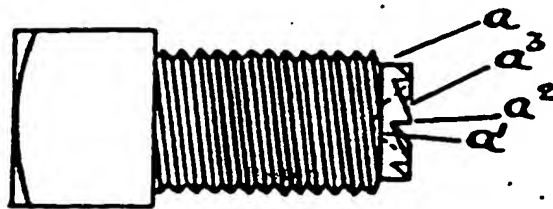


Fig. 1.

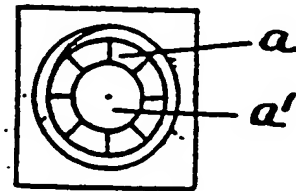


Fig. 2.

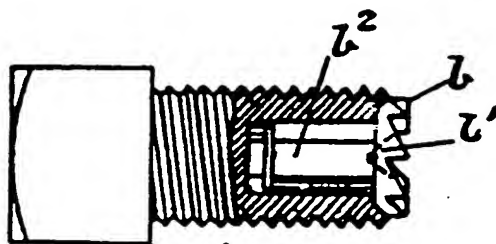


Fig. 3.

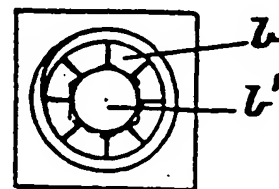


Fig. 4.

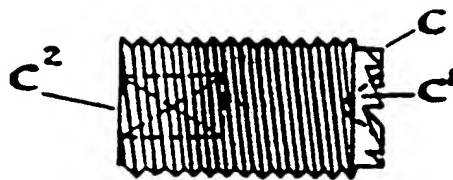


Fig. 5.

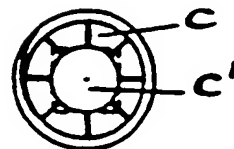


Fig. 6.

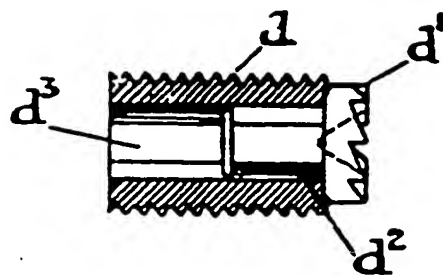


Fig. 7.

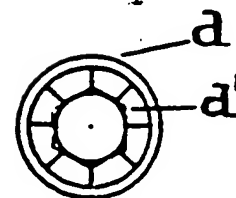


Fig. 8.